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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,153	02/20/2007	Martin D. Bijker	008895-0325576	1952

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EXAMINER	
TUROCY, DAVID P	
ART UNIT	PAPER NUMBER
1717	

NOTIFICATION DATE	DELIVERY MODE
06/30/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/566,153	BIJKER ET AL.	
	Examiner	Art Unit	
	DAVID TUROCY	1717	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 June 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-18 and 20-37* is/are pending in the application.

4a) Of the above claim(s) *17,19-32 and 35-37* is/are withdrawn from consideration.

5)☒ Claim(s) *4* is/are allowed.

6)☒ Claim(s) *1,2,5-16,33 and 34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/6/2011 has been entered.

Response to Amendment

2. Applicant's amendments, filed 6/6/2011, have been fully considered and reviewed by the examiner. The examiner notes the amendment to claim 1 and 17. Claims 1-2, 4-18, 20-37 remain pending in the instant application and claims 17-18, 20-32 and 35-37 are withdrawn due to a restriction requirement.

Response to Arguments

3. Applicant's arguments filed 6/6/2011 have been fully considered but they are not persuasive.

The applicant has failed to define the scope of "substantially do not create an interference pattern in any area of overlap of the resulting layer" and the metes and bounds of this limitation. In other words, the substantial term is a degree term and it is the examiner's position that Yang discloses two plumes that do not substantially create an interference pattern with each other and substantially correspond to the shape of a

single plume. See Figure 12A, which discloses a small amount of overlap. Additionally, the examiner notes the prior art process discloses overlap of the plurality of plumes to form a uniform coating and the present invention discloses overlapping the deposition profile to form a uniform coating. Yang discloses at Figure 3, a zig-zag arrangement of the plasma plumes. This would result in the a plurality of plumes that do not substantially interfere with each other and will provide the uniform coating as claimed. This arrangement clearly reads on the claims 5-6 as drafted. Taking the disclosure of Figure 12A in combination with the disclosed Figure 3 zip-zag arrangement, it is the examiners position that substantially no interference will exists between the adjacent plasma plumes when arranged on different planes.

The applicant's have failed to address the broad teaching of Yang, which discloses that it is known to adjust the distance and other plasma factors, including flow of plasma gas between the two plumes and the showing of the zig-zag shaped arrangement, which would result in plasma plumes that do not substantially overlap, but will provide a uniform coating because the coating profile will overlap.

At the very least, Yang discloses adjusting the spacing between the two plumes to provide a uniform coating "is a relatively simple matter to determine by simple experimentation" and therefore clearly the spacing is taught as a result effective variable and one of ordinary skill in the art at the time of the invention would have, through routine and simple experimentation, determined the appropriate spacing to deposit a uniform coating.

The applicant's have failed to address the fact that the present claims require overlap of a Gaussian profile and achieves this overlap through adjusting the distance between the plasma plumes and other process conditions, the exact same mechanism entailed by the prior art Yang reference. At the very least, the prior art adjusts the plasma plume distance and process parameters to achieve a uniform coating and moving the plumes/adjusting the process parameters to achieve this uniform coating would have been obvious through routine experimentation to achieve a desired uniform coating.

The applicant's have argued that the Yang reference ignores the fact that the plasma plumes of the ETP will interfere with each other and will push each other away. As a result, interference-like deposition patterns have been found to arise and depositing a film that is not uniform. However, this position is not supported by any factual evidence. The Yang reference states "spacing of the ETP generating means also has an effect on the uniformity of the coating" (see column 6, lines 22-23) and therefore the reference does acknowledge the existence of the spacing afecting the uniformity. Specifically, Yang's broad teaching discloses various arrangements of plasma plumes, including the zig-zag arrangement that will provide horizontal and vertical spacing that is increased to provide for a uniform coating, i.e. substantially preventing interference like deposition patterns.

The applicant's have argued that the evidence provided by Yang in the patent discloses large variation in thicknesses and therefore must result in interference patterns. This data only discloses the particular embodiment and example and fails to

take into consideration the broad disclosure of Figure 3 and column 6 and ignores the fact that the prior art discloses adjusting the distance/spacing and plasma characteristics, including size of plasmas, power and flow rates of the gases including inert gas.

All other arguments are directed at the Yang reference and its failure to adjust the distance between the two sources as discussed above. These are considered unpersuasive for the reasons as set forth above.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 5-11, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang alone or in view of US Patent 5985378.

he examiner incorporates herein by reference the remarks regarding the Yang teaching as discussed in paragraph 3 above.

ang discloses A method for applying a coating on a substrate, comprising: a coating process including arranging, opposite the substrate, at least two expanding thermal plasma (ETP) sources which provide the substrate with a coating, wherein the substrate is located in a process room in which the pressure is lower than the pressure, prevailing in the ETP sources, of a carrier gas which is introduced into the process

room via the sources and which forms the expanding plasma, wherein the coating provided by each source has a layer thickness according to a deposition profile, and choosing different process parameters such that, after the coating process, addition of the deposition profile results in a substantially uniform layer thickness of the coating on a part of the substrate (figures, column 6, lines 22-56). Yang explicitly discloses the arrangement of the ETP sources as claimed (figure 3) and such an arrangement will provide at least two sources where in the sources are spaced apart such that the ETP sources do not “substantially” influence each other. The zig-zag feature of Figure 3 reads on the limitations of claim 5-6.

Yang does not explicitly disclose that the plasma share in a single plasma plume is as claimed. However, Yang disclose the zig zag shaped pattern as claimed in claim 6 and also discloses "in order to maximize uniformity, it is preferred to provide a spacing such that there is overlap between edge portions of the plurality of plasma plumes” and discloses “it is relatively simple matter to determine by simple experimentation the optimum spacing for each coating apparatus”. Therefore taking the reference in its entirety, it would have been obvious to have provided desired spacing, including a zig-zag spacing as illustrated by Figure 3, as well as provide overlap of the deposited material, but without substantial interference pattern as claimed.

The applicant has failed to define the scope of "substantially do not create an interference pattern” and the metes and bounds of this limitation. In other words, the substantial term is a degree term and it is the examiner's position that Yang discloses

two plumes that do not substantially interfere with each other and substantially correspond to the shape of a single plume. See Figure 12A, which discloses a small amount of overlap. The examiner notes the prior art process discloses overlap of the plurality of plumes to form a uniform coating and the present invention discloses overlapping the deposition profile to form a uniform coating. Yang discloses at Figure 3, a zig-zag arrangement of the plasma plumes. This would result in the a plurality of plumes that do not substantially interfere with each other and will provide the uniform coating as claimed. This arrangement clearly reads on the claims 5-6 as drafted. Taking the disclosure of Figure 12A in combination with the disclosed Figure 3 zig-zag arrangement, it is the examiners position that substantially no interference pattern will occur between two plasma plumes.

Again at the very least, Yang discloses adjusting the spacing between the two plumes to provide a uniform coating "is a relatively simple matter to determine by simple experimentation" and therefore clearly the spacing is taught as a result effective variable and one of ordinary skill in the art at the time of the invention would have, through routine and simple experimentation, determined the appropriate spacing to deposit a uniform coating.

Finally, the examiner cites here 5985378, which discloses a desire to reduce edge effects of linear arrangement of plasma sources and discloses “the desired effect can be obtained with a number of different embodiments . . . one skilled in the art can easily fine the arrangement most suitable for his or her application" (column 9 10-16, figures) and thus discloses the arrangement and spacing of the plasma plumes will

create edge non-uniformity and thus is a result effective variable. Therefore, taking the references collectively, it would have been obvious to have determined the appropriate arrangement of plasma plumes through routine experimentation to reap the benefit of reducing/substantially eliminating edge effects of adjacent plasmas.

As for the requirement of setting the distance, arc flow and pressure of carrier gas, this is clearly taught by Yang at column 6, lines 22-42 and example 5-8, wherein the gas flow rates including inert gas (see examples) and the power are set, i.e. thus setting the arc flow as claimed. Additionally, the Yang reference discloses these are set to form the uniformity of the film deposited by a plurality of plasma plumes and therefore they are taught as result effective variables, directly effecting the uniformity of the film. Specifically, Yang discloses the power, flow rates of the gases, and distance between sources directly effect the deposition profile, i.e. the arc flow and the carrier gas pressure (a portion of the gas can be considered a carrier gas) and therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the plasma parameters and adjust these parameters used in the process, through routine experimentation, to deposit a coating with the desired properties.

Claims 5-6: Theses claims are taught by the Yang reference as discussed above.

Claim 7-10 and 34: Yang recognizes these parameters as result effective variables, directly affecting the deposited film profile (column 6). Specifically, Yang

discloses the power, flow rates of the gases, and distance between sources directly effect the deposition profile, i.e. the arc flow and the carrier gas pressure (a portion of the gas can be considered a carrier gas) and therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the plasma parameters and adjust these parameters used in the process, through routine experimentation, to deposit a coating with the desired properties.

Claim 11: The reference fails to disclose the adjusting the outflow angle of the plasma plumes relative to the substrate; however, this is clearly a result effective variable, directly effecting the deposited profile and since Yang is concerned with the deposited profile of each plume, it would have been obvious to have determined the optimal value and adjust the value to obtain a uniform coating, through routine experimentation.

Claim 33: Yang discloses a Gaussian profile (see "bell curve" profile at column 5, lines 40-45)

6. Claims 2, 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang alone or in view of 5985378 and further in view of US Patent 6140773 by Anders et al.

Claim 2: Yang discloses all that is taught above and discloses measuring the film thickness (example) and the film thickness and deposition profile of each ETP source can be adjusted by varying process parameters to provide a uniform film (Column 6, lines 22-55). However, Yang in view of 5985378 fails to disclose feedback

control as claimed, however, Anders discloses a plasma array method, disclose thickness control using feed back control, comprising sensors to determine the thickness variation over the substrate and adjusting the plasma processing parameters to arrive at a uniform thickness. Therefore taking the references collectively, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Yang in view of 5985378 to use the feedback control techniques, i.e. in process thickness measuring and adjusting process parameters to arrive at the desired film uniformity, with a reasonably expectation of predictable and successful results. Additionally, Anders discloses feedback control of the plasma sources is known and suitable in the art to provide a uniform film on a moving substrate (Column 18, lines 22-68) and therefore using such would have led to predictable and successful results.

Claim 12: Anders makes obvious to automatically measure the thickness during the process.

Claims 13-14: Anders discloses optical or electrical sensors, will measure the resistivity as claimed, to measure the film (abstract) and therefore using such would have been obvious to one of ordinary skill in the art at the time of the invention to provide predictable results. Additionally, all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. See *KSR Int'l Inc. v. Teleflex Inc.*, 127 S Ct. 1727, 1741, 82 USPQ2d.

Claim 15: Yang discloses a profilometer which can reasonably be considered a thickness gauge.

7. Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yang alone or in view of 5985378 and further in view of EP 985742 A2, hereafter EP 742.

Yang in view of 5985378 discloses all that is taught above and while the examiner maintains the position with regards to claim 11 above, the examiner cites here EP 742 which explicitly discloses controlling the plasma outflow angle provides certain benefits and adjusting such is a result effective variable, directly effecting the deposition profile (0028) and therefore it would have been obvious to have determined the optimal value and adjust the value to obtain a uniform coating, through routine experimentation.

8. Claims 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yang in view of 5985378 and/or Anders and further in view of JP 09-111435, hereafter JP 435.

Yang in view of 5985378 and/or Anders discloses all that is discloses above and the references disclose measuring the thickness using a sensor, but fails to disclose measuring the temperature of the substrate. However, JP 435 explicitly discloses, during plasma coating, measuring the substrate temperature provides an indication of the coating thickness and therefore one of ordinary skill in the art at the time of the invention would have found it obvious to have modified Yang in view of 5985378 and/or Anders to measure the temperature as claimed with a reasonable expectation of predictably and successful monitoring the thickness of the plasma coating.

Allowable Subject Matter

9. Claim 4 is allowed.

10. The following is a statement of reasons for the indication of allowable subject matter: None of the prior art cited or reviewed by the examiner reasonably discloses switching on the plasma sources in alternation to provide plasma plumes that do not substantially interfere with each other when coating a stationary substrate.

Conclusion

11. References cited on the PTO-892, but not utilized in the prior art rejections above are considered relevant to at least one of the claimed limitations. US Patent Publication 20030159654 discloses at 0049 thickness measuring. US Patent 5985378 discloses plasma array arrangement. US Patent Publication 20030097988 discloses ETP plasma array.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID TUROCY whose telephone number is (571)272-2940. The examiner can normally be reached on Monday-Friday, 7-5 a.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Turocy/
Primary Examiner, Art Unit 1717